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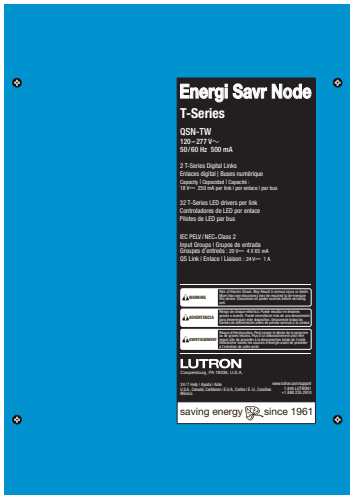
T-Series Energi *Savr* Node



The Energi Savr Node family is a group of intelligent, modular products for the control of lighting loads. This document describes the T-Series Energi Savr Node for digital addressable loads. It provides T-Series digital link power and control for two independent T-Series digital links with up to 32 Lutron T-Series LED drivers on each link to create a smoothly integrated tunable-white solution for both color temperature (CCT) control and light intensity control. The T-Series Energi Savr Node unit also provides direct connections and power for the following Lutron devices in a Quantum or Athena system:

- Occupancy sensors
- Daylight sensors
- IR receivers
- QS devices

Model Number

- QSN-TW

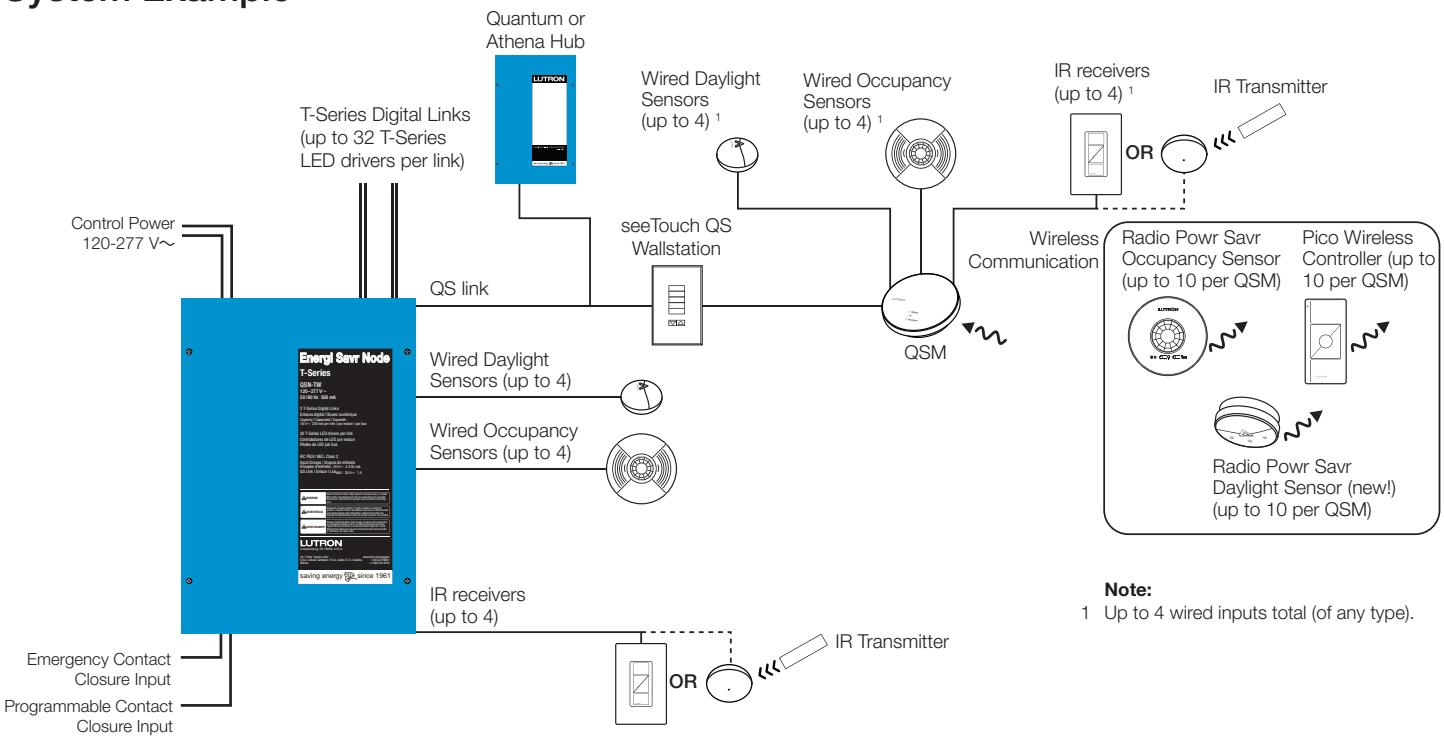
Features

- Supports 32 Lutron T-Series LED drivers per digital link, 64 Lutron T-Series LED drivers per unit.
- Supports 0.1% dimming LED drivers. See T-Series LED driver spec for more details.
- For best tunable-white performance, operate at 1% or higher. See T-Series LED driver spec for more details.
- Provides intuitive, perceived linear control of both color and intensity.
- Includes QS control link for seamless integration of lights in a Quantum or Athena system.
- Provides communication power for up to 2 loops of T-Series digitally addressable loads (up to 250 mA per loop).
- Each T-Series digital link can control a maximum of 16 zones. Zones of CCT control and zones of intensity control both contribute towards this limit.
- Power failure memory retains control unit programming in the event of a power loss.
- Four occupancy sensor inputs for automated control of lights.
- Four daylight sensor inputs automatically adjust light levels based on the amount of natural light entering through the windows.
- Four IR receiver inputs for personal control.
- Supports preset scene fade times from 0 seconds to 16 minutes.
- RoHS compliant

LUTRON SPECIFICATION SUBMITTAL Page 1

Job Name:	Model Numbers:	
Job Number:		

System Example



Note:
1 Up to 4 wired inputs total (of any type).

Note: This device is not compatible with the Energi Savr Node iOS programming app. It is only for use in a Quantum or Athena system

Job Name:	Model Numbers:	
Job Number:		

Specifications

Regulatory Approvals

- cUL® Listed
- NOM Certified
- Lutron Quality Systems registered to ISO 9001.2015
- IEC 62386-101 Ed. 1
- For commercial use, FCC Class A only.

Power

- Control Power: 120-277 V~ 50/60 Hz
- Maximum current draw: 0.5 A
- Lightning strike protection meets ANSI/IEEE standard 62.31-1980. Can withstand voltage surges of up to 6000 V~ and current surges of up to 3000 A.
- T-Series digital link output: 18 V⎓ 250 mA maximum per loop
- 10-year power failure memory: restores lighting to levels prior to power interruption.

Environment

- Ambient Temperature Operating Range: 32 °F to 104 °F (0 °C to 40 °C).
- Relative humidity: less than 90% non-condensing.
- For indoor use only.
- Complies with requirements for use in other spaces used for environmental air (plenums) per NEC® 2014 300.22(C)(3).

Terminals

- Control power wiring: 14 AWG to 12 AWG (2.5 mm^2 to 4.0 mm^2)
- T-Series digital link wiring: 20 AWG to 16 AWG (0.5 mm^2 to 1.5 mm^2)
- Input group wiring: 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)
- QS link wiring: 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2)

Physical Design

- NEMA Type 1, IP-20 protection.

Mounting

- Surface-mount.

T-Series Digital Links

- Up to 32 Lutron T-Series LED drivers on each loop can be addressed and grouped into 16 zones. Zones of CCT control and zones of intensity control both contribute towards this limit.
- T-Series Energi Savr Node unit supplies 250 mA to power each loop.
- T-Series digital link wires are polarity insensitive and topology free.
- Do not connect EcoSystem devices to T-Series digital links.

QS Link Limits

- Each T-Series Energi Savr Node unit can provide up to 30 Power Draw Units for other QS devices. Refer to the QS Link Power Draw Units specification submittal (Lutron P/N 369405) for more information concerning Power Draw Units.
- Each T-Series Energi Savr Node unit counts as 1 device towards the device limit on the QS link. Refer to the Lutron System Rules document (Lutron P/N 369821) for more information concerning QS link device limits.
- Each T-Series Energi Savr Node unit can count as 1 to 32 zones towards the 100 zone limit, depending on the number of zones created (up to 32 zones in a Quantum or Athena system).
- A maximum of 8 T-Series digital links may be connected to the QS link.
- T-Series Energi Savr Node unit counts as up to 128 switchlegs.

QS Link Sensor Limits

- 100 wired and wireless occupancy sensors.
- 100 wired and wireless daylight sensors.
- 100 wired wallstations or Pico wireless controllers.

Sensors Connected to the T-Series Energi Savr Node Units

- Four power supply outputs
- 20 V⎓ 65 mA maximum

Specifications *(continued)*

Occupancy Sensors

- Use Lutron LOS series of wired occupancy sensors in occupancy mode to control one or more areas.
- Use Lutron occupancy sensors in vacancy mode to automatically turn the lights off in an area after it becomes vacant.
- Use Lutron occupancy sensors to automatically turn the lights on in area when it becomes occupied and to automatically turn the lights off in an area after it becomes vacant.
- Each of the four occupancy inputs can power one Lutron occupancy sensor.
- Up to four additional Lutron wired occupancy sensors or ten additional Radio Powr Savr occupancy/vacancy sensors can be assigned per QS Sensor Module (QSM) on the QS link.

seeTouch QS Controls

- Refer to seeTouch QS Spec Submittal for further information.
- Configurable seeTouch QS wallstations, refer to the QS Wallstation Programming Guide for configuration options

IR Controls

- Use Lutron IR receivers or wired Pico keypads for personal control of individual lighting zones.
- Four IR devices can connect directly to the T-Series Energi Savr Node unit.

Daylight Sensors

- Lutron daylight sensors allow daylight harvesting with programmable effect on light output.
- Four daylight sensors can be connected directly to the T-Series Energi Savr Node unit.
- Use Lutron EC-DIR-WH sensors to control one or more daylight rows.
- Alternatively, up to four additional Lutron Wired Daylight Sensors or ten additional Radio Powr Savr Daylight Sensors can be assigned per QSM on the QS link.

Contact Closure Input (CCI)

- Inputs must be dry contact closure, solid state, open collector, or active-low (NPN)/active high (PNP) output.
  - Open collector NPN or active-low on-state voltage must be less than 2 V and sink 3.0 mA.
  - Open collector PNP or active-high on-state voltage must be greater than 12 V and source 3.0 mA.
  - Open circuit voltage: 24 V maximum.
  - Off-state leakage current must be less than 100 µA.
  - Accepts maintained inputs and momentary inputs with 40 msec minimum pulse times
- Configurable for normally open (NO) or normally closed (NC) operation.
- Input is miswire-protected up to 36 V⎓.
- Functionality defined by Quantum or Athena system programming.

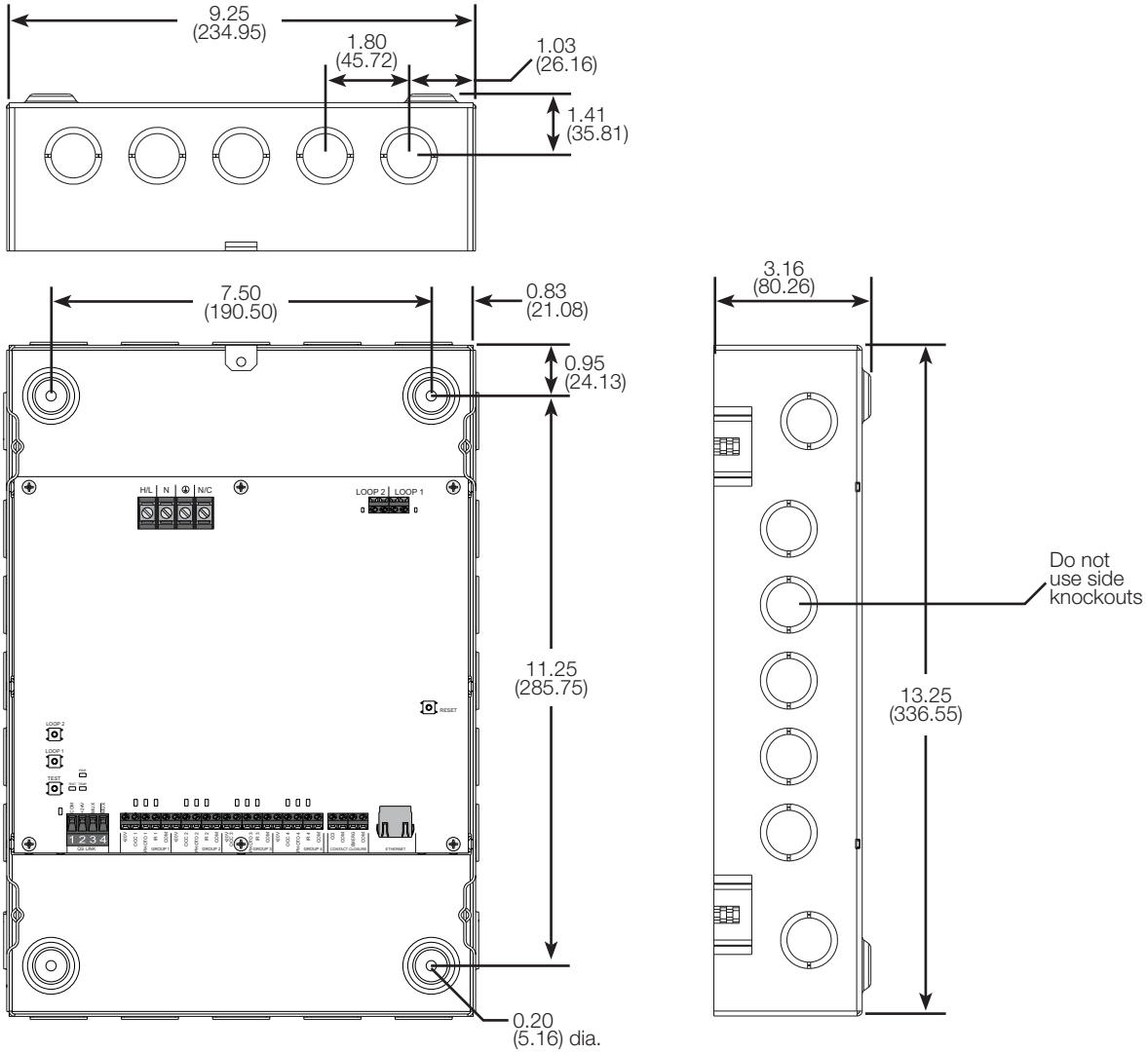
Emergency Contact Closure Input

- By default, contact closure input from Lutron Emergency Lighting Interface (LUT-ELI-3PH), security, or fire alarm systems turns all zones on to full output when emergency state is detected.
- Emergency contact closure input is normally closed (NC). The T-Series Energi Savr Node unit is shipped with a jumper pre-installed.
- Response of each zone is configurable.
- Attached devices, by default, will go to maximum output and ignore control inputs.
- No operations will be allowed until emergency signal is cleared.
- Inputs must be dry contact closure, solid state, open collector, or active-low (NPN)/active high (PNP) output.
  - Open collector NPN or active-low on-state voltage must be less than 2 V and sink 3.0 mA.
  - Open collector PNP or active-high on-state voltage must be greater than 12 V and source 3.0 mA.
  - Open circuit voltage: 24 V maximum.
  - Off-state leakage current must be less than 100 µA.
  - Accepts maintained inputs and momentary inputs with 40 msec minimum pulse times
- Input is miswire-protected up to 36 V⎓.
- Emergency CCI cannot control other Energi Savr Node units.
- See Application Note #106, “Emergency Lighting” at www.lutron.com for more details.

Job Name:	Model Numbers:	
Job Number:		

Mechanical Dimensions

All dimensions shown as in (mm)



Job Name:	Model Numbers:	
Job Number:		

Wiring: QS Link

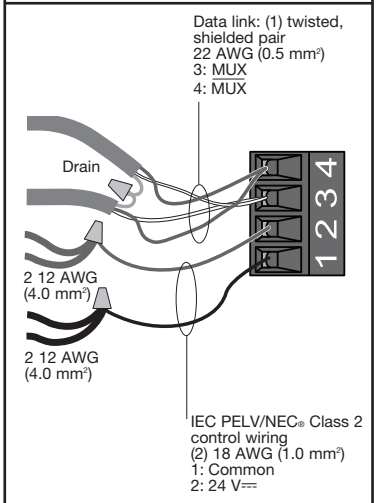
- QS link communication uses IEC PELV/NEC® Class 2 wiring. Follow all local and national electrical codes when installing IEC PELV/NEC® Class 2 wiring with line voltage wiring.
- The total distance of the QS link wiring must not exceed 2000 ft (610 m).

Wiring Distance	Wire Gauge	Lutron Cable
Less than 500 ft (152 m)	*Power (terminals 1 and 2):* 1 pair 18 AWG (1.0 mm²)	GRX-CBL-346S (non-plenum) GRX-PCBL-346S (plenum)
	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm²), twisted and shielded*	
500 ft to 2000 ft (152 m to 610 m)	*Power (terminals 1 and 2):* 1 pair 12 AWG (4.0 mm²)	GRX-CBL-46L (non-plenum) GRX-PCBL-46L (plenum)
	Data (terminals 3 and 4): 1 pair 22 AWG (0.5 mm²), twisted and shielded*	

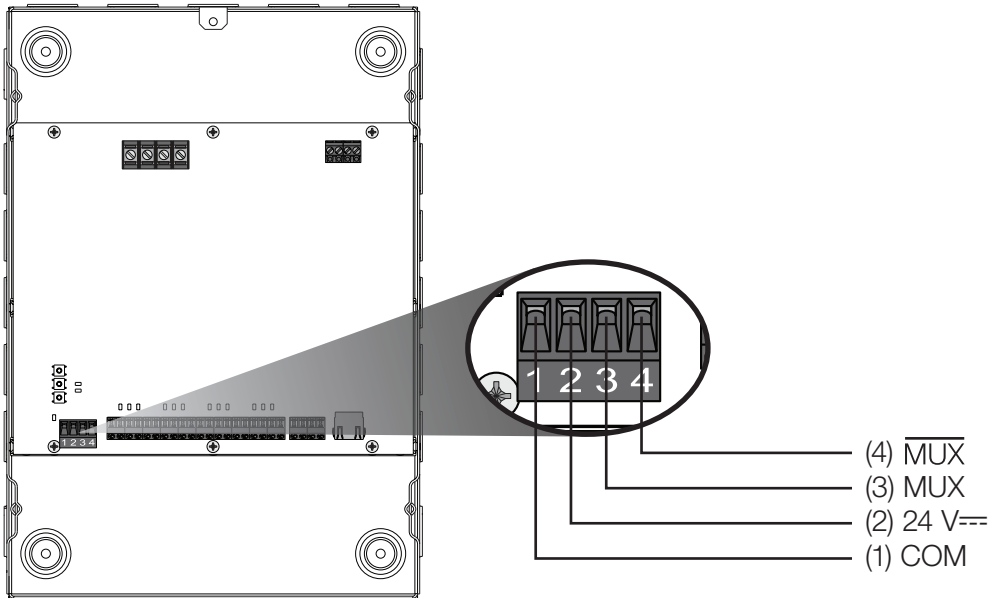
* Alternate Data-only cable: Use approved data link cable 22 AWG (0.5 mm²) twisted/shielded from Belden, model #9461.

Wiring for QS link for 500 ft to 2000 ft (152 m to 610 m).

Terminal block will not accept 12 AWG (4.0 mm²) directly.



Control Link Wiring



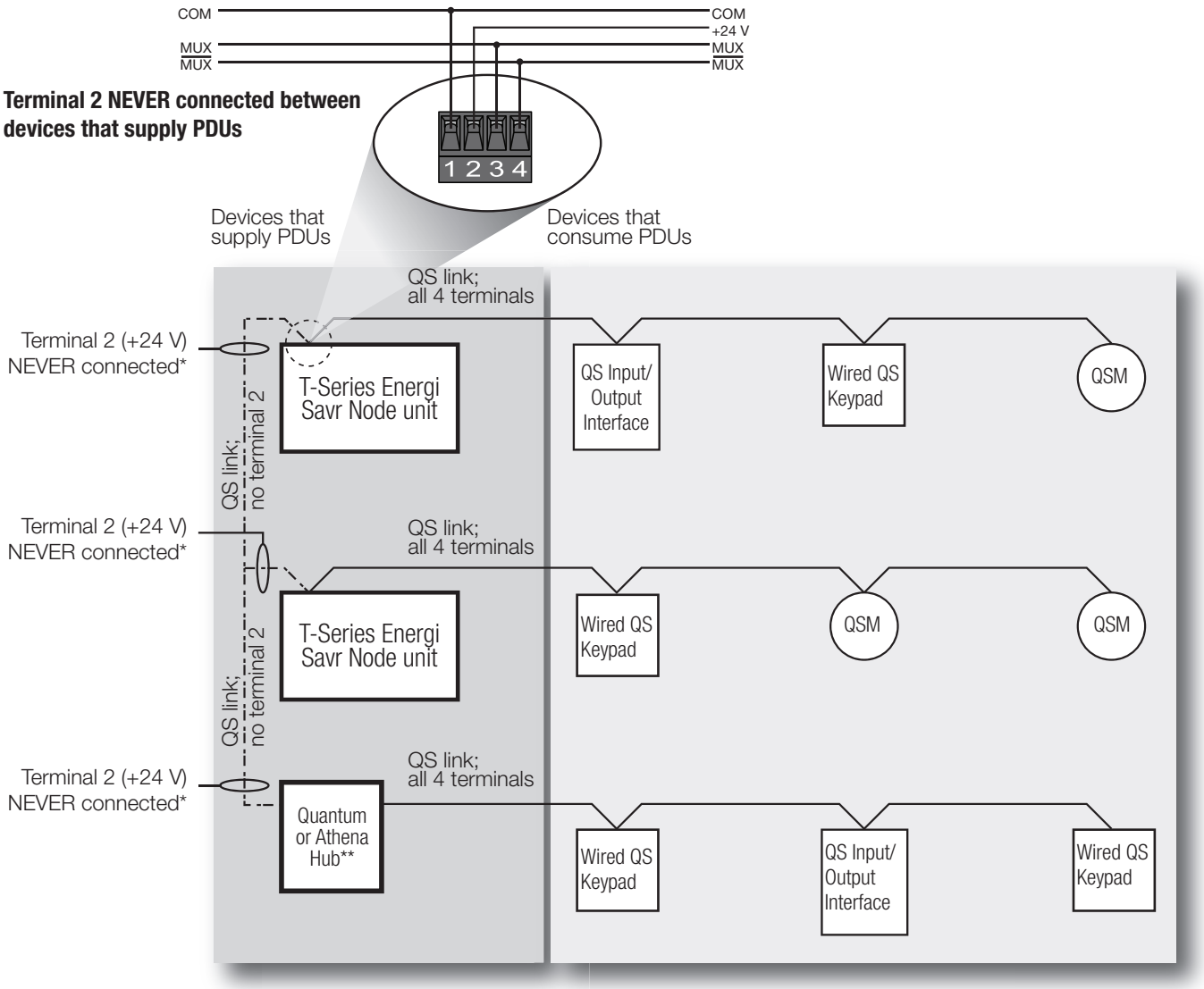
QS Link Wiring:
22 AWG to 12 AWG
(0.5 mm² to 4.0 mm²)

Job Name:	Model Numbers:	
Job Number:		

Wiring: QS Link *(continued)*

Only terminals 1, 3, and 4 connected between devices that supply PDUs

All 4 terminals connected to QS link devices that consume PDUs



QS Link Wiring Rules

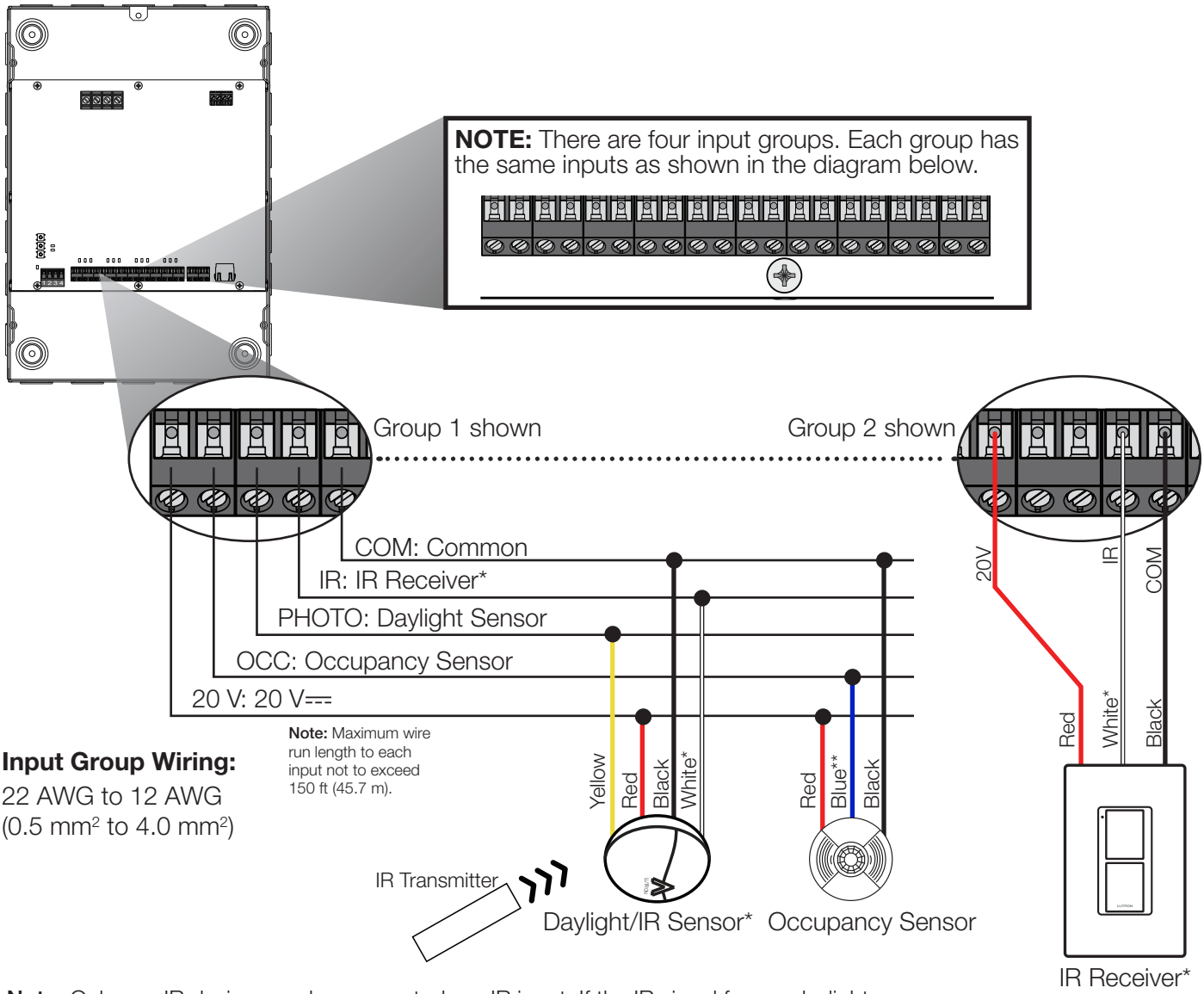
* Terminal 2 (+24 V) should NEVER be connected between devices that supply PDUs.

** For Quantum or Athena Hub wiring connection details, refer to the installation instructions for the specific Quantum or Athena Hub model being used.

NOTE: Refer to the QS Link Power Draw Units specification submittal (Lutron P/N 369405) for information concerning Power Draw Units (PDUs)."

Job Name:	Model Numbers:	
Job Number:		

Wiring: IEC PELV/NEC® Class 2 Inputs



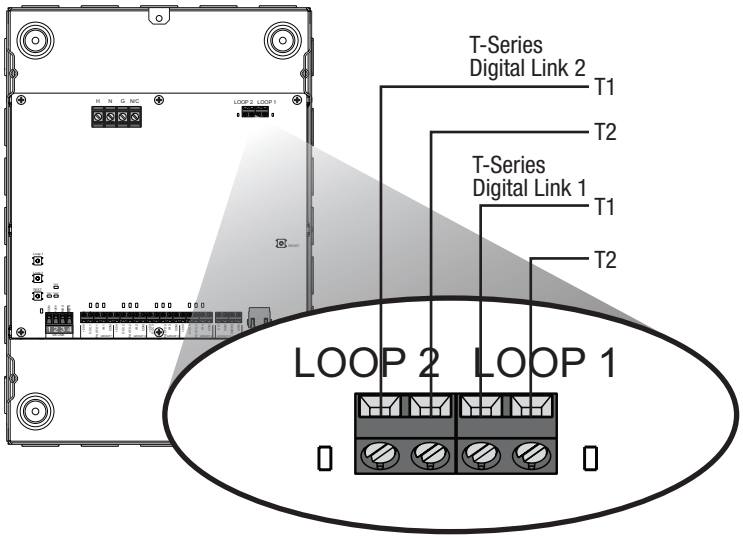
Input Group Wiring:
22 AWG to 12 AWG
(0.5 mm² to 4.0 mm²)

* **Note:** Only one IR device may be connected per IR input. If the IR signal from a daylight sensor is connected, an IR receiver may not be connected to the same input, and vice-versa.

** Connect the gray wire on -R model occupancy sensors.

Job Name:	Model Numbers:	
Job Number:		

Wiring Diagram: T-Series Digital Link



The T-Series Energi Savr Node unit will supply power to an independent T-Series digital link, which supports a maximum of 32 Lutron T-Series LED drivers per link.

T-Series Digital Link Wiring

- The T-Series Digital Link may be wired Class 1 or Class 2. Consult applicable electrical codes for proper wiring practices. Please refer to Lutron Application Notes #106 and #142 at www.lutron.com for more information.
- Ensure that there is not greater than a 2 V⎓ drop between the T-Series Energi Savr Node unit and the end of the T-Series digital link.
- Consult all national and local electrical codes for separation requirements.

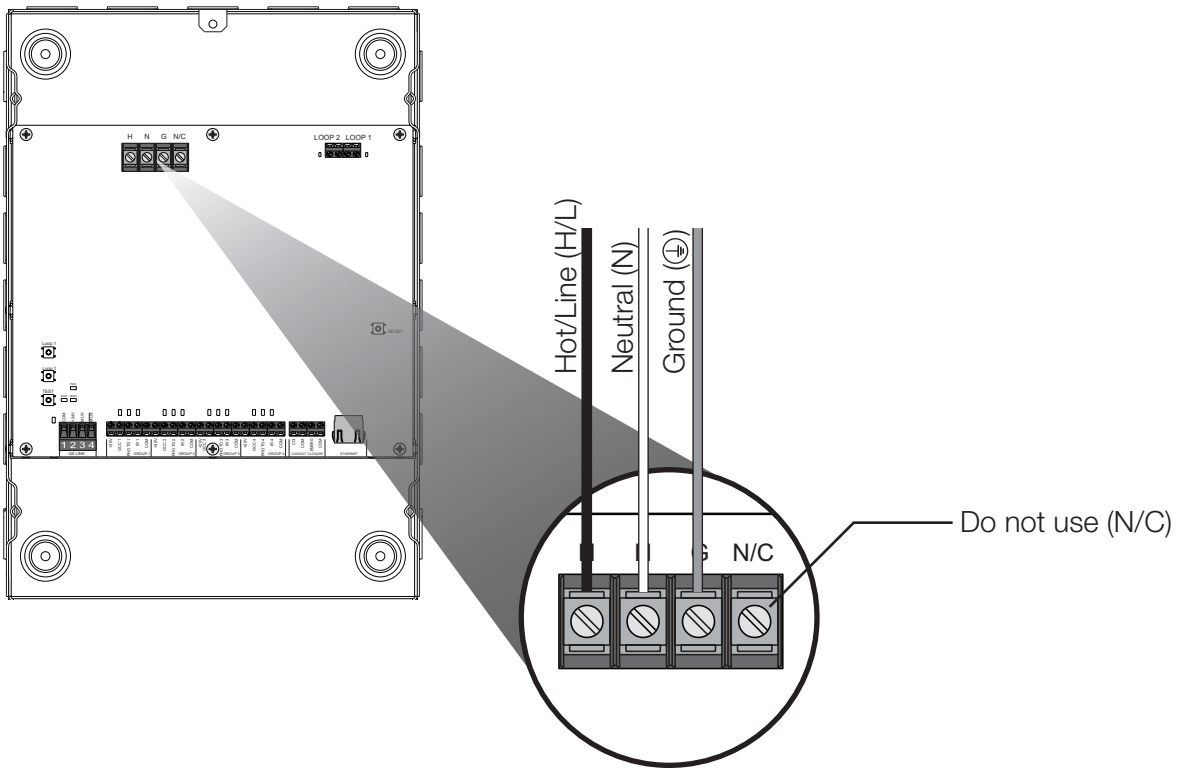
Wire Gauge	Maximum Wire Length
12 AWG (4.0 mm^2)	1000 ft (305 m)
14 AWG (2.5 mm^2)	1000 ft (305 m)
16 AWG (1.5 mm^2)	900 ft (275 m)
18 AWG (1.0 mm^2)	550 ft (167 m)

Job Name:	Model Numbers:	
Job Number:		

Wiring: Control Power

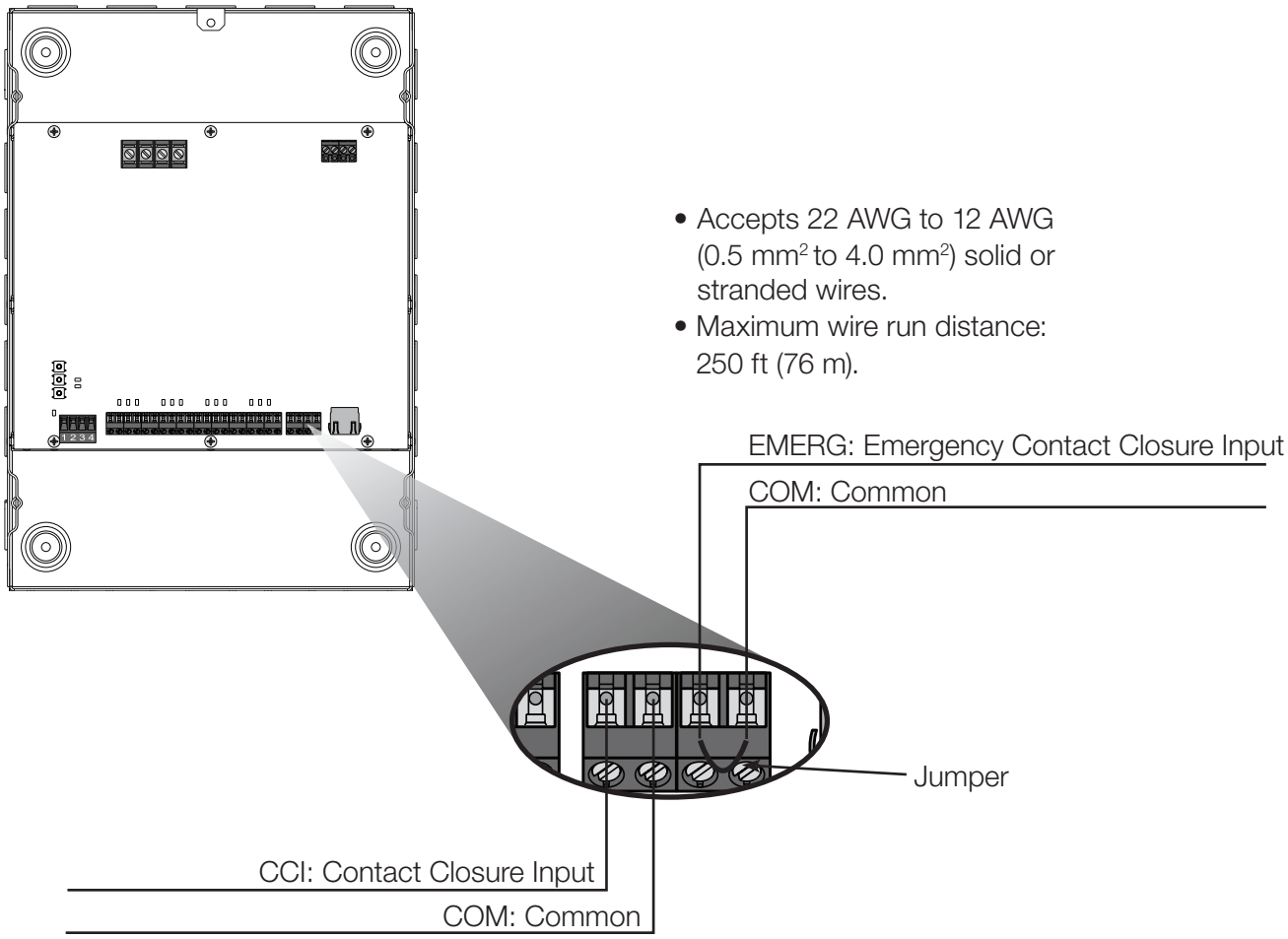
Wiring Notes

- Control Power wiring should be from a normal, non-emergency feed for proper operation of the T-Series Energi Savr Node unit.
- Power terminals accept (1) or (2) 14 AWG to 12 AWG (2.5 mm^2 to 4.0 mm^2) solid or stranded wire.



Job Name:	Model Numbers:	
Job Number:		

Wiring: Contact Closure Inputs



- Accepts 22 AWG to 12 AWG (0.5 mm^2 to 4.0 mm^2) solid or stranded wires.
- Maximum wire run distance: 250 ft (76 m).

Emergency CCI

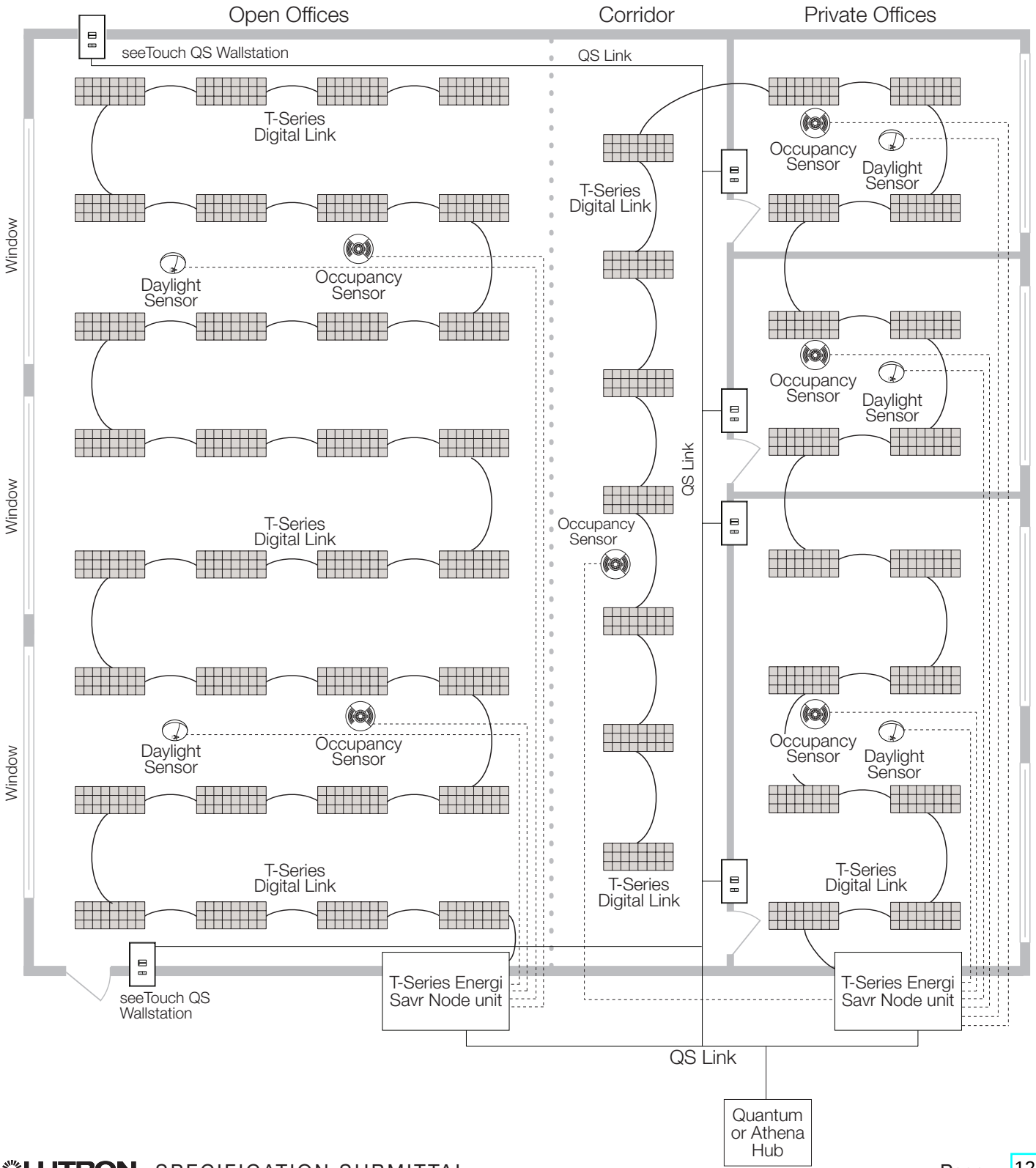
- The attached device must provide a closed dry contact closure or solid-state output.
- Input is miswire-protected up to 36 V⎓.
- The T-Series Energi Savr Node unit is shipped with a jumper pre-installed in the Emergency Contact Closure Input.
- Emergency mode is activated by opening the Emergency Contact Closure. Pre-installed jumper must be removed to utilize this function.
- See Application Note #106, “Emergency Lighting” at www.lutron.com for more details.

Programmable CCI

- The attached device must provide a dry contact closure or solid-state output.
- Input is miswire-protected up to 36 V⎓.

Job Name:	Model Numbers:	
Job Number:		

Typical Application: Requires Quantum or Athena system commissioning



Job Name:	Model Numbers:	
Job Number:		

Troubleshooting and Maintenance Features

- Maintains redundant memory of driver programming for ease of single or multiple driver replacement.
- After installation, "TEST" button verifies T-Series digital link wiring on all fixtures. The test mode allows all fixtures on the digital link to be adjusted to high-end, low-end, flashing, or off. To test the color, high-end will send the lights to the coolest color and highest intensity, low-end will send it to the warmest color and lowest intensity, flashing will alternate between warm/dim, and cool/bright, and off will turn off the lights.
- Status LEDs verify connections to control stations and sensors.

Job Name:	Model Numbers:	
Job Number:		